IN THE CLAIMS:

11. (Currently Amended) A method of exposing a resist on a substrate comprising the steps of:

    a) providing the substrate with a film of resist;

    b) placing the substrate on a stage; ~~and~~

    c) sensing the position of the substrate with a displacement sensor, wherein said displacement sensor comprises a differential variable reluctance transducer (DVRT); and

    d) providing a source of radiation, and exposing said resist with said radiation.

12. (Previously added) The method as recited in claim 11, wherein the substrate comprises a wafer.

13. (Previously added) The method as recited in claim 12, wherein said wafer comprises a semiconductor.

14. (Cancel)

15. (Currently amended) The method as recited in claim ~~14~~ 11, wherein said radiation has a wavelength to provide a structure having a dimension less than 100nm.

16. (Currently amended) The method as recited in claim 15, wherein said radiation comprises x-ray radiation.

17. (Currently amended) The method as recited in claim 16, further comprising the step of collimating ~~wherein~~ said x-ray radiation ~~is collimated~~.

18. (Currently amended) The method as recited in claim 16, further comprising the step of concentrating ~~wherein~~ said x-ray radiation ~~is concentrated~~.

19. (Previously added) The method as recited in claim 14, further comprising the step of providing a mask for defining exposure of said resist.

20. (Previously added) The method as recited in claim 19, wherein said mask is spaced from said substrate by a gap, said method further comprising the step of moving said stage to adjust said gap.

21. (Previously added) The method as recited in claim 19, further comprising the step of using output of said displacement sensor to control said exposing step.

22. (Previously Amended) The method as recited in claim 21, wherein said mask is positioned with respect to said substrate, said method further comprising the step of exposing said resist at a time when said displacement sensor output indicates that position of said mask with respect to said substrate is optimum.

23. (Previously added) The method as recited in claim 22, wherein said mask is spaced from said substrate by a gap, said method further comprising the step of exposing said resist at a time when said displacement sensor output indicates that said gap is optimum.

24. (Previously Amended) The method as recited in claim 19, further comprising the step of using said displacement sensor output to control mask to wafer misalignment.

25. (Previously Amended) The method as recited in claim 11, further comprising the step of using said displacement sensor output to control substrate x, y, z, rotation, and magnification.

26. (Canceled)

27. (Previously added) A system for exposing a substrate comprising a stepper and an X ray source, vibration insulation there between.

28 to 36 (Canceled)

37. (Currently amended) A method of exposing a resist on a substrate comprising the steps of:

a) providing the substrate with a film of resist;

b) placing the substrate on a stage;

c) providing x-ray radiation from a point source;

d) using an inline collimator ~~or concentrator~~ to collimate ~~or concentrate collimating or concentrating~~ said x-ray radiation;

e) providing a mask for defining exposure of said resist;

f) illuminating said mask with said x-ray radiation after said collimating ~~or concentrating~~ step (d); and

g) exposing said resist with x-ray radiation passing through said mask.

38. (Previously added) The method as recited in claim 37, wherein said x-ray radiation has a wavelength to provide a structure having a dimension less than 100nm.

39. (Canceled)

40. (Previously added) The method as recited in claim 37, wherein the substrate comprises a wafer.

41. (Previously added) The method as recited in claim 40, wherein said wafer comprises a semiconductor.

42. (Previously added) The method as recited in claim 37, wherein said mask is spaced from said substrate by a gap, said method further comprising the step of moving said stage to adjust said gap.

43. (Previously added) The method as recited in claim 37, further comprising the step of sensing the position of the substrate with a displacement sensor.

44. (Currently amended) A method of exposing a resist on a substrate comprising the steps of:

a) providing the substrate with a film of resist;

b) placing the substrate on a stage;

c) providing x-ray radiation from a point source;

d) collimating ~~or concentrating~~ said x-ray radiation;

e) providing a mask for defining exposure of said resist;

f) illuminating said mask with said x-ray radiation after said collimating ~~or concentrating~~ step (d);

g) exposing said resist with x-ray radiation passing through said mask; and

h) sensing position of the substrate with a displacement sensor wherein said displacement sensor comprises a differential variable reluctance transducer (DVRT).

45. (Previously amended) The method as recited in claim 43, further comprising the step of using output of said displacement sensor to control said exposing step.

46. (Previously amended) The method as recited in claim 45, wherein said mask is positioned with respect to said substrate, said method further comprising the step of exposing said resist at a time when said displacement sensor output indicates that position of said mask with respect to said substrate is optimum.

47. (Previously amended) The method as recited in claim 45, wherein said mask is spaced from said substrate by a gap, said method further comprising the step of exposing said resist at a time when said displacement sensor output indicates that said gap is optimum.

48. (Previously amended) The method as recited in claim 43, further comprising the step of using displacement sensor output to control mask to wafer misalignment.

49. (Previously amended) The method as recited in claim 43, further comprising the step of using displacement sensor output to control substrate x, y, z, rotation, and magnification.

50. (Currently amended) The method as recited in claim 37, wherein said x-ray radiation passes through a beam transport chamber having helium or other low attenuation gas or helium and another low attenuation gas at atmospheric pressure or at lower pressure.

51. (Previously added) The method as recited in claim 43, wherein said displacement sensor comprises a differential variable reluctance transducer (DVRT).

52. (Previously added) The method as recited in claim 44, further comprising the step of using output of said DVRT to control said exposing step.

53. (Currently amended) The method as recited in claim 52, wherein said mask is positioned with respect to said substrate, said method further comprising the step of exposing said resist at a time when said output of said DVRT ~~output~~ indicates that position of said mask with respect to said substrate is optimum.

54. (Currently amended) The method as recited in claim 52, wherein said mask is spaced from said substrate by a gap, said method further comprising the step of exposing said resist at a time when said output of said DVRT ~~output~~ indicates that said gap is optimum.

55. (Currently amended) The method as recited in claim 44, further comprising the step of using output of said DVRT ~~output~~ to control mask to wafer misalignment.

56. (Currently amended) The method as recited in claim 44, further comprising the step of using output of said DVRT ~~output~~ to control substrate x, y, z, rotation, and magnification.

57. (New) The method as recited in claim 44, further comprising the step of using output of said DVRT to provide positional feedback for six degrees of freedom alignment of the substrate.

58. (New) The method as recited in claim 57, further comprising the step of controlling all six degrees of freedom of the substrate.

59. (New) The method as recited in claim 51, further comprising the step of using output of said DVRT to control said exposing step.

60. (New) The method as recited in claim 59, wherein said mask is positioned with respect to said substrate, said method further comprising the step of exposing said resist at a time when said output of said DVRT indicates that position of said mask with respect to said substrate is optimum.

61. (New) The method as recited in claim 59, wherein said mask is spaced from said substrate by a gap, said method further comprising the step of exposing said resist at a time when said output of said DVRT indicates that said gap is optimum.

62. (New) The method as recited in claim 51, further comprising the step of using output of said DVRT to control mask to wafer misalignment.

63. (New) The method as recited in claim 51, further comprising the step of using output of said DVRT to control substrate x, y, z, rotation, and magnification.

64. (New) A method of exposing a resist on a substrate comprising the steps of:

a) providing the substrate with a film of resist;

b) placing the substrate on a stage;

c) providing x-ray radiation from a point source;

d) using an inline concentrator to concentrate said x-ray radiation;

e) providing a mask for defining exposure of said resist;

f) illuminating said mask with said x-ray radiation after said concentrating step (d); and

g) exposing said resist with x-ray radiation passing through said mask.

65. (New) A method of exposing a resist on a substrate comprising the steps of:

a) providing the substrate with a film of resist;

b) placing the substrate on a stage;

c) providing x-ray radiation from a point source;

d) concentrating said x-ray radiation;

e) providing a mask for defining exposure of said resist;

f) illuminating said mask with said x-ray radiation after said concentrating step (d);

g) exposing said resist with x-ray radiation passing through said mask; and

h) sensing position of the substrate with a displacement sensor wherein said displacement sensor comprises a differential variable reluctance transducer (DVRT).